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ON THE QUANTITY AND QUALITY

OF

THE WATER SUPPLIED TO LONDON

DURING

1879,

BEING

THE ANNUAL REPORT SUBMITTED TO THE SOCIETY OF  
MEDICAL OFFICERS OF HEALTH.

BY

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LONDON :

J. & A. CHURCHILL, 11, NEW BURLINGTON STREET.

1880.

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*Price Sixpence.*

LONDON :  
PRINTED BY WERTHEIMER, LEA AND CO.,  
CIRCUS PLACE, LONDON WALL.

TO THE  
PRESIDENT, COUNCIL AND MEMBERS OF THE  
SOCIETY OF MEDICAL OFFICERS OF HEALTH.

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3, MANDEVILLE PLACE,

MANCHESTER SQUARE, W.,

*January 26th, 1880.*

GENTLEMEN,

An average of 32·7 gallons of water per head have been daily supplied during 1879 to upwards of four millions of people by the eight London water companies.

This quantity is in my opinion at least one-third in excess of what is necessary or even advisable.

The vast population within the districts of the companies reside in 573,792 houses, of which about a quarter (138,624) are on the constant service (December).

All the water (except about  $\frac{1}{19}$  of the total quantity, viz., that supplied by the Kent Water Company) is filtered before delivery, and no less than 82 acres of ground are covered by filter beds for the efficient filtration of the water.

In Table I. I have stated for your information the quantities supplied monthly by the eight London water companies, the number of houses so supplied, and the quantity (including waste) per head of the population.

One-half of the water, in round numbers, was taken from the River Thames, and the remainder from the Lea, the New River, and from chalk wells.

T A B L E I.  
AVERAGE DAILY SUPPLY TO THE METROPOLIS  
DURING 1879.

*(Estimated Population supplied by the eight Companies,  
June, 1879, 4,101,200.)*

1879.	Average daily supply in Gallons.	Number of Houses supplied.	Quantity supplied daily, in Gallons, per Head of the population.
January .....	137,099,205	552,657	33·2
February ...	129,941,893	554,227	31·6
March .....	129,561,672	556,767	31·5
April .....	128,493,940	557,660	31·3
May .....	132,584,711	562,058	32·5
June .....	134,725,591	563,000	32·8
July .....	135,981,121	565,798	33·1
August .....	140,308,815	566,755	34·2
September ...	139,492,704	568,773	34·0
October .....	134,868,826	571,608	32·8
November ...	131,877,956	572,505	32·1
December ...	138,810,978	573,792	33·8
Average.....	134,478,951	563,800	32·7

NOTE.—It is believed that these quantities are given upon the gross capacities of the pumps, and that they are consequently subject to a deduction of about 10 per cent. to arrive at the net quantities.

T A B L E I I.  
AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATER  
DURING THE YEAR 1879.

The quantities of the several constituents are calculated in grains per imperial gallon (70,000 grains).	Ammonia.		Nitrogen as Nitrates, &c.	Oxygen required to Oxidize Organic Matter, &c.	TOTAL SOLIDS.	Lime.	Magnesia.	Chlorine	Sulphuric Acid.	Hardness on Clark's Scale.	
	Saline.	Organic.								Before Boiling.	After Boiling.
<i>Thames Water Companies.</i>	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Grains.	Degrees.	Degrees.
Grand Junction .....	0.000	0.008	0.148	0.094	21.12	7.865	0.583	1.092	1.452	14.3°	4.1°
West Middlesex .....	0.000	0.009	0.137	0.083	21.03	7.960	0.576	1.078	1.437	14.2°	3.9°
Southwark and Vauxhall.	0.000	0.008	0.124	0.089	20.94	7.524	0.548	1.074	1.482	13.8°	3.8°
Chelsea .....	0.000	0.008	0.135	0.065	20.32	7.650	0.520	1.122	1.557	13.9°	3.8°
Lambeth .....	0.000	0.008	0.134	0.078	21.09	7.550	0.592	1.116	1.519	14.1°	3.9°
<i>Other Companies.</i>											
Kent .....	0.000	0.003	0.392	0.011	28.84	9.580	0.823	1.709	2.550	18.7°	6.3°
New River .....	0.000	0.005	0.145	0.045	20.84	7.753	0.535	1.092	1.395	14.1°	3.6°
East London .....	0.000	0.008	0.139	0.058	22.21	7.990	0.603	1.193	1.549	14.8°	4.1°

NOTE.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours.

In Table II. (*see page 5*) I have as usual given the average composition of the water of the London companies during 1879, the detailed analysis of the several samples having been month by month duly submitted to you.

GRAND JUNCTION.—The *total solid* matter obtained by evaporation to dryness ranged from 19·70 grs. per gallon in April, to 22·50 grs. in December; the *Nitrogen* as *Nitrates*, from 0·050 gr. in November, to 0·165 gr. in June. The *minimum* amount of oxygen needed to oxidize the organic and other matters per gallon, was in April (0·026 gr.), and the *maximum* in June (0·165 gr.).

The samples collected in January and June contained a slight trace of suspended matter. In the other months the water was clear.

WEST MIDDLESEX.—The *total solid* matter ranged from 20·00 grs. per gallon in January, to 22·00 grs. in February and December; the *Nitrogen* as *Nitrates* from 0·095 gr. in July, to 0·210 gr. in December. The *minimum* amount of oxygen needed to oxidize the organic and other matters per gallon, was in April (0·015 gr.), and the *maximum* in September (0·159 gr.).

None of the samples contained any matters in suspension.

SOUTHWARK AND VAUXHALL.—The *total solid* matter ranged from 18·20 grs. per gallon in January, to 23·70 grs. in December; the *Nitrogen* as *Nitrates* from 0·102 gr. in June to 0·180 gr. in December. The *minimum* amount of oxygen needed to oxidize the organic and other matters per gallon was in February (0·036 gr.), and the *maximum* in September (0·155 gr.).

The sample collected in January contained a trace of suspended matter. In the other months the water was clear.

CHELSEA.—The *total solid* matter ranged from 19·00 grs. in July to 22·20 grs. in February; the *Nitrogen* as *Nitrates* from 0·090 gr. in August, to 0·210 gr. in January. The



*minimum* amount of oxygen needed to oxidize the organic and other matters per gallon was in June (0·033 gr.), and the *maximum* in July (0·105 gr.).

The samples collected in January and November contained a trace of suspended matter. All the other samples were clear.

LAMBETH.—The *total solid* matter ranged from 20·20 grs. per gallon in June to 22·10 grs. in December; the *Nitrogen* as *Nitrates* from 0·094 gr. in July, to 0·180 gr. in December. The *minimum* amount of oxygen needed to oxidize the organic and other matters per gallon was in May (0·036 gr.), and the *maximum* in September (0·148 gr.).

The sample collected in January contained a trace of suspended matter. In the other months the water was clear.

KENT.—The *total solid* matter ranged from 26·70 grs. per gallon in September, to 31·10 grs. in December; the *Nitrogen* as *Nitrates* from 0·300 gr. in July to 0·450 gr. in November and December. The amount of oxygen needed to oxidize the organic and other matters per gallon ranged from 0·001 gr. in July to 0·039 gr. in November.

The samples collected were uniformly bright and clear.

NEW RIVER.—The *total solid* matter ranged from 19·40 grs. per gallon in March to 22·40 grs. in February; the *Nitrogen* as *Nitrates* from 0·120 gr. in June and August to 0·200 gr. in December.

The *minimum* amount of oxygen needed to oxidize the organic and other matters per gallon was, in November (0·014 gr.), and the *maximum* in August (0·107 gr.).

The samples collected from the mains were, without exception, bright and clear.

EAST LONDON.—The *total solid* matter ranged from 20·00 grs. per gallon in October to 26·00 grs. in February; the *Nitrogen* as *Nitrates* from 0·105 gr. in May and July to 0·195 gr. in December. The *minimum* amount of oxygen

needed to oxidize the organic and other matters per gallon, was in April (0.028 gr.), and the *maximum* in October (0.086 gr.).

The samples, as collected from the company's mains, were, without exception, perfectly bright, and free from suspended matter.

I would remark here that the year through which we have passed has been an exceptionally trying one for the water companies—indeed, far more trying than any of which I have had experience. The excessive rainfall has rendered the Thames more frequently than usual thick and turbid. It was to have been expected that the analyses would show a larger average amount of organic matter than in previous years, and the only thing which need surprise us is that it is not greater than results prove it to be.

And yet notwithstanding this (and I specially direct your attention to the fact), the death rate of London for 1879 is the lowest on record.

When I write my next report it is not unlikely that the water supply will have passed out of the hands of the companies, and the management be vested in some other body. I will not venture to predict the future of the London Water Supply, but I again repeat what I have said more than once before, that in my opinion no better sources of water can be found for the Metropolis, considering all the facts of the case, than the rivers Thames and Lea. I trust, when the companies have passed into the hands of Government, that the general management of the several works will be as good as now, and that the change the public have clamoured for, and the more efficient working that the public expect, will be seen, not merely in lessened taxation, but in the improved health of the people and in a lower death rate.

Your faithful Servant,  
C. MEYMOTT TIDY.